AMENDMENT TO THE EA:

MANAGEMENT OF VULTURE DAMAGE IN THE COMMONWEALTH OF VIRGINIA

October 2004

INTRODUCTION

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), Wildlife Services (WS) program responds to requests for assistance from individuals, organizations and agencies experiencing damage caused by wildlife. Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003 199). However, WS decided to prepare an environmental assessment (EA) to assist in planning vulture damage management (VDM) activities and to clearly communicate with the public the analysis of environmental impacts associated with various alternatives for addressing vulture damage (www.aphis.usda/ws/eafrontpage.html). The EA documented the need for vulture damage management in the Commonwealth of Virginia and assessed potential impacts of various alternatives for responding to damage problems. WS' proposed action was to implement an Integrated Wildlife Damage Management (IWDM) program on all land classes in Virginia. Comments from the public involvement process were reviewed for substantial issues and alternatives which were considered in developing a Record of Decision and Finding of No Significant Impact (FONSI). Additional public comments were received after the completion of the EA and FONSI. These additional comments and agency response are attached in Appendix A of this amendment. This amendment addresses the issues raised in public comments received after the January 2003 FONSI and updates the data and population impact analysis in the original EA (USDA 2002). This analysis is an addition to that in the EA and FONSI signed on January 15, 2003, and all information in the both documents remain valid unless otherwise noted below.

The EA and FONSI signed on January 15, 2003, may be obtained from www.aphis.usda/ws/eafrontpage.html or from the Office of the State Director, USDA, APHIS, Wildlife Services, P.O. Box 130, Moseley, Virginia 23120.

The EA analyzed the potential environmental and social effects of alternatives for resolving vulture damage related to the protection of agriculture, property, and threats to public health and safety on private and public lands in Virginia. Virginia has an area of 26,090,880 acres. In Fiscal Year (FY) 2002, Virginia WS had agreements to conduct vulture damage management on about 14,917 acres or less than 0.00057% of the land area (Management Information System (MIS) 2002).

WS is the Federal program authorized by law to reduce damage caused by wildlife (Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c); the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c); and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767). Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1992). WS uses an IWDM approach, commonly known as Integrated Pest Management (WS Directive 2.105) in which a combination of methods may be used or recommended to reduce damage. The IWDM approach uses nonlethal or lethal methods sequentially or simultaneously, depending on which methods are practical and effective. IWDM is used as part of the WS Decision Model (Slate et al. 1992, USDA 1997, WS Directive 2.201). The imminent threat of damage or loss of resources is often deemed sufficient for wildlife damage management actions to be initiated (U.S. District Court of Utah 1993). Resource management agencies and individuals have requested WS to conduct VDM to protect agriculture and property in Virginia. Resource owners have also requested WS conduct VDM to protect human health and safety. All Virginia WS wildlife damage management is in compliance with relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act of 1973.

Virginia WS works and consults with the Virginia Department of Game and Inland Fisheries (VDGIF), Virginia Department of Agriculture and Consumer Services (VDACS), and United States Department of Interior (USDI), Fish and Wildlife Service (USFWS) to reduce wildlife damage. The VDGIF has the responsibility to manage all wildlife in Virginia, including federally listed threatened and endangered (T&E) species and migratory birds, which are a joint responsibility with the USFWS. Memoranda of Understanding (MOUs) signed between APHIS-WS and the VDGIF and VDACS clearly outline the responsibility, technical expertise and coordination between agencies. A multi-agency team with representatives and consultants from each of the aforementioned agencies participated in the assessment of impacts of WS vulture damage management in Virginia. The VDGIF, VDACS and USFWS worked with Virginia WS to determine whether the proposed action is in compliance with relevant management plans, laws, regulations, policies, orders, and procedures.

AFFECTED ENVIRONMENT

The areas of the proposed action include agricultural areas (e.g., livestock farms) where black vultures could prey on livestock, and property in or adjacent to subdivisions, business and industrial parks, or other areas inhabited or used by people where vultures roost or loaf. Additionally, the public and local health officials have concerns about large quantities of fecal droppings associated with vulture roosts when roosts are near human habitation and where children play. The proposed action could be conducted on private and public property.

PUBLIC INVOLVEMENT

Issues related to the proposed action were initially identified by an interdisciplinary team involving the VDGIF and USFWS. This multi-agency team refined the issues and developed preliminary alternatives. An invitation for public comment on the pre-decisional EA was sent to 403 individuals or organizations identified as interested in Virginia WS or VDGIF projects. Notice of the proposed action and invitation for public involvement on the pre-decisional EA was placed in four newspapers (Richmond Times-Dispatch, The Virginia Pilot, The Roanoke Times, and The Washington Times) with circulation throughout Virginia. There was a 34-day comment period for the public to provide input on the pre-decisional EA. One hundred twenty comment letters were received from the public. All comments were analyzed to identify substantial new issues, alternatives, or to redirect the program. A decision and finding of no significant impact was signed on January 15, 2003, and the public and commentors were notified of this decision. All letters and responses are maintained in the administrative file located at the Virginia WS State Office, P.O. Box 130, Moseley, Virginia 23120. WS response to specific comments and issues are included in Appendix A of the Decision and FONSI signed on January 15, 2003.

Opposition to the EA and FONSI was raised initially by two professors at Virginia universities; five birding organizations, and one animal advocacy organization. The WS program met with one of the professors and representatives of the birding and animal advocacy groups on June 27, 2003, in Riverdale, Maryland, to share information and hear concerns. The issues raised and WS response to the issues are provided in Appendix A of this amendment

Copies of this amendment have been sent to 116 individuals or organizations identified as interested in VDM including all persons who provided comment on the EA (and an address) and subsequent Decision and FONSI. Notice of this amendment will also be published in four newspapers (Richmond Times-Dispatch, The Virginia Pilot, The Roanoke Times, and The Washington Times) with circulation throughout Virginia. Public comments on the amendment will be accepted for 32 days (until November 27, 2004) from the date of publication of the notice of availability in the above newspapers. All comments received will be evaluated and considered in the development of a new Decision.

MAJOR ISSUES

The EA described the alternatives and evaluated each alternative using the issues identified by the public and the multi-agency team described above. The following issues were identified as important to the scope of the analysis (40 CFR 1508.25).

- Effects on black and turkey vulture populations
- Effects on nontarget wildlife species populations, including T&E species
- Effects on human health and safety
- Effects on aesthetics
- Humaneness of lethal bird control methods

ALTERNATIVES

The following Alternatives were developed by the Multi-agency Team to respond to the issues. A detailed discussion of the effects of the Alternatives on the issues is described in the EA. The following is a summary of the Alternatives:

- Alternative 1 - **Integrated Wildlife Damage Management/ Vulture Damage Management Program (Proposed Action)** - The proposed action is for the WS program in the Commonwealth of Virginia to continue the current Integrated Wildlife Damage Management (IWDM) program that will respond to requests for Vulture Damage Management (VDM) to protect property, livestock, pets, human health and safety, and agricultural resources (Table 1). An IWDM approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with turkey or black vultures (Appendix B of the EA). WS would respond to requests for assistance by 1) providing technical advice to property owners/managers on actions they could take to reduce damages caused by vultures, and/or 2) conducting operational control actions for the property owner or manager.

  Actions by property owner or manager

  Property owners/managers requesting assistance would be provided with information regarding the use of effective and practical nonlethal and lethal techniques. Property owners/managers may choose to implement WS recommendations on their own, use contractual services of private businesses, use volunteer services of private organizations, use contractual services of Wildlife Services or take no action. Implementation of nonlethal methods such as habitat alteration, husbandry practices, harassment, scare devices, and mechanical repellents is usually the responsibility of the property owner or manager.

  The property owner or manager may choose to apply for their own depredation permit from the USFWS to lethally take vultures, as required by the implementing regulations of the Migratory Bird Treaty Act (MBTA) for depredation control (50 CFR 21.41). The USFWS requires nonlethal methods be used and shown ineffective or impractical before the USFWS will issue a depredation permit. In this situation, WS would evaluate the damage and complete a Migratory Bird Damage Report (WS Form 37) which would include information on the extent of the damages, the number of vultures present, and a recommendation for the number of vultures that should be taken to best alleviate the damages.

  Following USFWS review of a complete application for a depredation permit from a property owner or manager and the Migratory Bird Damage Report, a depredation permit could be issued to authorize the lethal take of a specified number of vultures as part of an IWDM approach. Upon receipt of a depredation permit, the property owner or manager or appropriate subpermittee may commence the authorized activities and must submit a written report of their activities upon expiration of their permit. Permits may be renewed annually as needed to resolve damages. Property owners or managers could conduct VDM using shooting or any nonlethal methods that are legal. Not all of the methods listed in Appendix B of the EA as potentially available to WS would be legally available to property owners/managers.

Actions by Wildlife Services

VDM by WS would be provided in Virginia, when requested, on private property or public facilities where a need has been documented and upon completion of an *Agreement for Control* between WS and the property owner or manager. WS uses an IWDM approach were nonlethal or lethal methods are applied sequentially or simultaneously, depending on which methods are practical and effective. Lethal methods used by WS would include shooting and live trapping followed by euthanasia. Nonlethal methods used or recommended by WS may include habitat alteration, husbandry practices, wire barriers and deterrents, tactile repellents, harassment, and scaring devices.

To address the anticipated needs of all property owners/managers with vulture damages in Virginia that may request WS assistance with lethal methods to alleviate their damages, WS would submit an application for a one-year depredation permit to the USFWS estimating the maximum number of vultures of each species to be lethally taken as part of an IWDM approach. WS would not submit a Migratory Bird Damage Report for their own application. The USFWS would conduct an independent review of the application, and if acceptable, issue a permit as allowed under the depredation permit regulations. WS could request an amendment of their permit to increase the number of vultures that would be taken to address unpredicted and emerging vulture damages/conflicts. Each year, WS would submit an application for renewal of their permit, and through the use of Adaptive Management principles, would adjust numbers of vultures to meet anticipated needs, based upon management actions in the previous year and anticipated damages and conflicts in the next year. The USFWS would review these applications annually, and issue permits as allowed by regulations. All alterations in the number of animals to be taken will be checked against the impacts analyzed in this EA. All management actions by WS would comply with appropriate federal, state, and local laws.

Alternative 2 - **Nonlethal VDM Only By WS** - Under this alternative, only nonlethal direct control activities and technical assistance would be provided by WS to resolve vulture damage problems.(Table 1).

Actions by property owner or manager

Property owners/managers requesting assistance from WS would be provided only with information regarding the use of effective and practical nonlethal methods. The nonlethal methods recommended by WS would follow those identified in Alternative 1 (Appendix B). Property owners/managers may choose to implement WS' nonlethal recommendations on their own, use contractual services of private businesses, use volunteer services of private organizations, use contractual services of WS or take no action. In situations where nonlethal methods were impractical or ineffective to alleviate damages, WS would refer requests for information regarding lethal information to VDGIF, USFWS, local animal control agencies, or private businesses or organizations. Under this alternative, however, property owners/managers might be limited to using nonlethal methods only as they may have difficulty obtaining permits for lethal methods. The USFWS needs professional recommendations on individual damage situations before issuing a depredation permit for lethal methods, and the USFWS does not have the mandate or resources to conduct wildlife damage management work. State agencies with responsibilities for migratory birds would likely have to provide this information if depredation permits are to be issued. If the information were provided to the USFWS, following the agency's review of a complete application package for a depredation permit from a property owner or manager to lethally take vultures, the permit issuance procedures would follow that described in Alternative 1 (under Property Owner or manager).

Property owners or managers could conduct VDM using shooting or any nonlethal method that is legal. Property owners or managers might choose to implement WS nonlethal recommendations, implement lethal methods or request assistance from some private or public entity other than WS. Property

owners/managers frustrated by lack of WS assistance with the full range of VDM techniques may try methods not recommended by WS (e.g., poisons). In some cases, property owners or managers may misuse some methods or use some methods in excess of what is necessary. The USFWS may authorize more lethal take than is necessary to alleviate vulture damages and conflicts because state agencies, businesses, and organizations have less technical knowledge and experience managing wildlife damage than WS.

Actions by Wildlife Services

VDM would be provided by WS in Virginia, when requested, on private property or public facilities where a need has been documented and upon completion of an *Agreement for Control* between WS and the property owner or manager. This assistance would be limited to nonlethal methods. The nonlethal methods used or recommended by WS would be identical to those identified in Alternative 1. WS would not need to apply for a depredation permit from the USFWS.

Alternative 3 - **Technical Assistance Only** - This alternative would be limited to technical assistance only from WS and would not allow for WS operational VDM in Virginia (Table 1).

Actions by property owners/managers

Property owners/managers requesting technical assistance from WS would only receive technical information regarding the use of effective and practical nonlethal and lethal methods. The nonlethal and lethal methods recommended by WS would be identical to those identified in Alternative 1. Property owners/managers may choose to implement WS' recommendations, use contractual services of private businesses, use volunteer services of private organizations, or take no action. In situations where nonlethal methods are ineffective or impractical, WS would advise the property owner or manager of appropriate lethal methods to supplement nonlethal methods. In order for the peoperty owner or manager to use lethal methods, they must apply for their own depredation permit to take vultures from the USFWS. WS would evaluate the damage and complete a Migratory Bird Damage Report (WS Form 37) which would include information on the extent of the damages, the number of vultures present, and a recommendation for the number of vultures that should be taken to best alleviate the damages. Following USFWS review of a complete application for a depredation permit from a property owner or manager and the Migratory Bird Damage Report, a depredation permit could be issued to authorize the lethal take of a specified number of vultures following the procedures identified in Alternative 1(under Property owner or manager).

Property owners or managers could conduct VDM using shooting or any nonlethal method that is legal. Alternative 1 and Appendix B of the EA describes a number of methods that could be employed by property owners or managers with or without receiving technical assistance advice from WS under this alternative.

Actions by Wildlife Services

WS would only provide technical assistance and assist property owners/managers with Migratory Bird Depredation Reports required by the USFWS. WS would not provide operational assistance under this alternative.

Alternative 4 - **Lethal VDM Only By WS** - Under this alternative, only lethal technical assistance and operational control services would be provided by WS (Table 1).

Actions by property owners/managers

Property owners or managers requesting assistance from WS would only be provided with information regarding effective and practical lethal methods. The recommended lethal methods would be limited to shooting birds. However, the USFWS requires nonlethal methods be used and shown ineffective or impractical before the USFWS will issue a depredation permit. WS would refer requests for information regarding effective and practical nonlethal methods to VDGIF, USFWS, local animal control agencies, or private businesses or organizations. Property owners and managers might choose to implement WS lethal recommendations, implement nonlethal methods or other methods not recommended by WS, use contractual services of private businesses, use volunteer services of private organizations, use contractual services of WS or take no action. In situations where nonlethal methods were impractical or ineffective WS would provide recommendation for effective and practical lethal methods. The property owner or manager may choose to apply for their own permit from the USFWS to lethally take vultures. In this situation, WS would complete a Migratory Bird Damage Report (WS Form 37) which would include information on the extent of the damages, the number of vultures present, and a recommendation for the number of vultures that should be taken to best alleviate the damages. Following USFWS review of a complete application for a depredation permit from a property owner or manager and the Migratory Bird Damage Report, a depredation permit could be issued to authorize the lethal take of a specified number of vultures following the procedures identified in Alternative 1(under Property owner or manager). Not all of the methods listed in Appendix B of the EA as potentially available to WS would be legally available to all other agencies or individuals.

Property owners or managers could conduct VDM using shooting or any nonlethal method that is legal. Property owners or managers in some cases might choose to implement WS lethal recommendations or implement lethal methods or other methods not recommended by WS. In some cases, control methods employed by property owners or managers could be contrary to the intended use of some of the methods or in excess of what is necessary. Inappropriate use of some nonlethal methods may result in injury to humans or damage to property. Potential harm to people and damage to property may occur because state agencies, businesses, and organizations have less technical knowledge and experience managing wildlife damage than WS. Appendix B of the EA describes a number of lethal methods available for use or recommended by WS under this alternative.

Actions by Wildlife Services

VDM would be provided by WS in Virginia, when requested, on private property or public facilities where a need has been documented and upon completion of an *Agreement for Control* between WS and the property owner or manager. This assistance would be limited to lethal methods. To address the anticipated needs of all property owners/managers with vulture damages in Virginia that would need lethal methods to alleviate their damages, WS would submit an application for a depredation permit to the USFWS. The permit application process would be identical to that described in Alternative 1. Following USFWS review of a complete application for a depredation permit from WS, the permit issuance would follow that described in Alternative 1 (under Wildlife Services).

Alternative 5 - **No Federal WS VDM** - This alternative would eliminate WS involvement in VDM in Virginia (Table 1). WS would not provide direct operational or technical assistance, and property owners/managers would have to conduct VDM without WS input. WS would refer all requests for assistance to VDGIF, USFWS, local animal control agencies, or private businesses or organizations.

Property owners or managers could conduct VDM using shooting or any nonlethal method that is legal. However, under this alternative property owners/managers may have difficulty obtaining permits to use lethal VDM methods. The USFWS needs professional recommendations on individual damage situations before issuing a depredation permit for lethal takes, and the USFWS does not have the mandate or the resources to conduct wildlife damage management work. State agencies with

responsibilities for migratory birds would likely have to provide this information if depredation permits are to be issued. If the information were provided to the USFWS, following the agency's review of a complete application package for a depredation permit from a property owner or manager to lethally take vultures, the permit issuance procedures would follow that described in Alternative 1 (under Property Owner or manager).

In some cases, control methods employed by property owners or managers could be contrary to the intended use of some of the methods or in excess of what is necessary. Inappropriate use of some nonlethal methods may result in injury to humans, damage to property and increased risk to nontarget species. These problems may occur because state agencies, businesses, and organizations have less technical knowledge and experience managing wildlife damage than WS. Appendix B of the EA describes a number of lethal and nonlethal methods available for use, not all of which are available to property owners or managers under this alternative.

In the initial FONSI, it was determined that Alternative 1 (*Integrated Wildlife Damage Management / Vulture Damage Management Program* (Proposed Action): 1) best addressed the issues identified in the EA, 2) provided safeguards for public health and safety, 3) provided WS the best opportunity to reduce damage while providing low impacts on nontarget species, 4) balanced the economic effects to agriculture and property, and 5) allowed WS to meet its obligations to the VDGIF, USFWS, and other agencies or entities.

Table 1. Actions that could be taken under each alternative of the vulture damage management in Virginia environmental assessment.

Actions	Alt. 1 IWDM VDM (Proposed Action/ No Action	Alt. 2 Nonlethal Only	Alt. 3 Technical Assistance (TA) Only	Alt. 4 Lethal Only	Alt. 5 No Federal VDM Program
WS provides technical assistance on nonlethal methods	X	X	X		
WS provides technical assistance on lethal methods	X		X	X	
WS provides nonlethal operational assistance	X	X			
WS provides lethal operational assistance & USFWS issues permit to WS	X			X	
Property owner able to use nonlethal techniques	X	X	X	Dependent on property owner's ability to find information on nonlethal techniques	Dependent on property owner's ability to find information on nonlethal techniques
Property owner able to use lethal techniques and & USFWS issues permit to property owner	X	Dependent on State's ability to provide permit recommendations to USFWS	X	X	Dependent on State's ability to provide permit recommendations to USFWS

CONSISTENCY

Wildlife damage management conducted in Virginia will be consistent with MOUs and policies of APHIS-WS, the VDGIF, and USFWS, and the EA. The agencies may, at times, restrict VDM in areas where there are special concerns about issues such as public safety or protected species.

Executive Order 13186 – "Responsibilities of Federal Agencies to Protect Migratory Birds" was signed on January 10, 2001 and requires: "Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations, is directed to develop and implement, a Memorandum of Understanding with the USFWS that shall promote the conservation of migratory bird populations." WS has developed a draft Memorandum of Understanding (MOU) with the USFWS as required by this Executive Order and is currently waiting for USFWS approval. WS will abide by the MOU once it is signed by both parties.

Executive Order 13352 – "Facilitation of Cooperative Conservation" was signed on August 26, 2004 and requires the Departments of Interior, Agriculture, Commerce, Defense, and Environmental Protection Agency to facilitate cooperative conservation to collaborate more with private landowners, private for-profit and non-profit groups, nongovernmental associations, individuals, and tribal, local and state governments on how to manage the environment. The executive order further requires that federal agencies take appropriate account of and respect the interests of persons with ownership or other legally recognized interests in land and other natural resources.

ENVIRONMENTAL CONSEQUENCES

Effects on Black and Turkey Vulture Populations

The Virginia WS program annually provides the VDGIF and USFWS data on WS' take of target and nontarget animals to ensure the total statewide take (by WS and other permittees) does not impact the viability of state and regional vulture populations as determined by the VDGIF or USFWS. In addition, the EA and amendment will be reviewed each year to ensure that the impacts of the program are within the parameters described below.

In calendar year 2003, WS took 93 black vultures and 51 turkey vultures and dispersed 4,454 vultures by harassment methods. The largest number of vultures removed by Virginia WS to resolve damage problems in any year was 549 vultures in calendar year 2002 (MIS, unpub. Data; Tables 3 & 4). Also, WS dispersed 8,122 black and turkey vultures with harassment methods in calendar year 2002. In calendar year 2001, 202 vultures were taken and 1,409 were dispersed. In calendar year 2000, 116 vultures were taken.

The public involvement process for this EA, Congressional Inquiries, and media campaigns conducted by some advocacy groups increased public awareness of Virginia WS' ability to assist with vulture damage. As a result, there may be increased requests for assistance with vulture damage problems and associated increases in the number of vultures taken by the WS program. In most instances, only a few vultures are removed to reinforce harassment efforts while dispersing roosts or protecting livestock from predation. WS usually anticipates taking less than 200 black vultures and less than 125 turkey vultures to alleviate damage in a given year. However, in rare circumstances it may be necessary for WS to reduce a local vulture population. A local population reduction would be described as reducing the number of vultures at a roost where damage could not be alleviated by traditional hazing and other nonlethal efforts after extensive effort has been tried, often tried multiple times without success. WS does not conduct regional or state-wide population reductions in Virginia. Considerably more vultures are taken during efforts to reduce local vulture populations than during hazing programs. Even with an anticipated increase in requests for services it is unlikely that WS would remove more than 1,500 vultures (1,000 black and 500 turkey vultures) annually in Virginia. However, this level of take will be analyzed to demonstrate the maximum potential impact of the WS program on Virginia vulture populations under a worst-case scenario. If this level of take does not have a significant impact on vulture populations, then there should also be no significant impact from lower levels of vulture take. In the EA, WS analyzed a take of 4,000 vultures. Subsequent consultations among WS and USFWS biologists have indicated that a maximum annual take of 1000 black and 500 turkey vultures is a more realistic estimate of WS maximum take under a worst-case scenario.

WS applied for and received a migratory bird depredation permit from the USFWS to take 950 black vultures and 300

turkey vultures in 2003. The USFWS concluded a level of take of 1,200 black and 1100 turkey vultures in Region 5[1] would have no negative impact on vulture populations (Letter to files, from R. Dettmer, USFWS, February 11, 2002).

The VA WS program took 83% of the total authorized take of black vultures and 27% of the total authorized take of turkey vultures in Region 5 in 2003 (Table 5). This was a reasonable expectation since the greatest relative abundance of black vultures in Region 5 was in Virginia and Maryland (Table 2). Similarly, the greatest relative abundance of turkey vultures in Region 5 occurred in Virginia, Maryland and Delaware (Table 2). Many of the Region 5 states have no black vulture population (Table 2). It should be noted that, historically, Virginia did not have black vultures until well into the 20th century (Kiff 2000). Black vultures were first reported in Virginia on the coastal plain in the early 20th century (T. Kain, Virginia Society of Ornithology, pers. commum.). Bent ((1937) cited in Buckley 1999) reported that black vultures started breeding in the southern piedmont of Virginia in the 1930's. The levels of WS vulture take for the period of 2000-2003 are in Tables 3 and 4.

Table 2. Relative abundance of and number of requests for assistance in federal fiscal year 2002 with damage caused by black, turkey, and mixed vulture flocks among states in Region 5 management unit of the U.S. Department of Interior, Fish and Wildlife Service. Relative abundance data are from the Breeding Bird Survey[A], 1990-2002 (www.mbr-pwrc.usdg.gov/bbs/bbs.html), and requests for assistance are from United States Department of Agriculture, Wildlife Services annual tables (www.aphis.usda.gov/WS).

	Black vulture		Turkey vulture		Mixed vulture
State	Relative abundance	Number of requests for assistance	Relative abundance	Number of requests for assistance	Number of requests for assistance
Virginia	0.89	85	4.08	35	29
Maryland	0.93	21	7.32	52	21
Delaware	0.68	0	14.78	5	6
West Virginia	0.11	1	3.11	1	1
Pennsylvania	0.15	5	1.52	24	0
New Jersey	0.21	4	2.78	38	10
New York	0.00	0	0.45	0	0
Connecticut	0.00	0	0.54	0	0
Rhode Island	0.00	0	0.28	0	0
Massachusetts	0.00	0	0.55	1	0
Vermont	0.00	0	1.00	0	0
New Hampshire	0.00	0	0.09	3	0
Maine	0.00	0	0.03	0	0

A. Sauer J. R., J. E. Hines, J. Fallon. 2003. The North American Breeding Bird Survey, Results and Analysis 1966-2002. Version 2003.1, USGS Patuxent Wildlife Research Center, Laurel, MD.

1 Region 5 of the Fish and Wildlife Service is comprised of the states of Maine, New Hampshire, Vermont, New York, Massachusetts, Rhode Island, Connecticut, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Virginia and the District of Columbia.

Table 3. Quantitative assessment of the impacts of WS and Total take on the Black Vulture Population in Virginia.

	Calendar Year				Theoretical Year
	2003	2002	2001	2000	
USFWS Population Estimate[B]	20,251	18,716	17,298	15,987	20,251
Rate of Annual Population Increase[C]	8.2%	8.2%	8.2%	8.2%	8.2%
Number of birds added to population	1661	1,535	1,418	1,311	1,661
WS take	93	463	108	66	1,000[A]
Non-WS take	84[E]	84[E]	84	40	84
Total take	177	547	192	106	1,084[D]
WS take as % of birds added	6%	30%	8%	5%	60%
Total take as % of birds added[D]	11%	36%	14%	8%	65%

A. Maximum estimated WS take during a "worst-case" scenario year. Population estimate is estimate for 2003 calculated by the USFWS.
B. USFWS estimate of the Virginia black vulture population obtained using data from the BBS survey with corrections for sources of bias in the survey.
C. Rate of population increase obtained from BBS population trend data for Virginia for the period of 1980-2002.
D. Total take calculated using WS estimate of take during a "worst-case" scenario and the highest value of non-WS take for the period of 2000-2003.
E. Data is unavailable so the highest known value is used.

Table 4. Quantitative assessment of the impacts of WS and Total take on the Turkey Vulture Population in Virginia.

	Calendar Year				Theoretical Year
	2003	2002	2001	2000	
USFWS Population Estimate[B]	101,339	99,743	98,172	96,626	101,339
Rate of Annual Population Increase[C]	1.6%	1.6%	1.6%	1.6%	1.6%
Number of birds added to population	1,621	1,596	1,571	1,546	1,621
WS take	51	86	94	50	500[A]
Non-WS take	41[E]	41[E]	41	0	41
Total take	92	127	135	50	541[D]
WS take as % of birds added	3%	5%	6%	3%	31%
Total take as % of birds added[D]	6%	8%	9%	3%	33%

A. Maximum estimated WS take during a "worst-case" scenario year. Population estimate is estimate for 2003 calculated by the USFWS.
B. USFWS estimate of the Virginia turkey vulture population obtained using data from the BBS survey with corrections for sources of bias in the survey.
C. Rate of population increase obtained from BBS population trend data for Virginia for the period of 1980-2002.
D. Total take calculated using WS estimate of take during a "worst-case" scenario and the highest value of non-WS take for the period of 2000-2003.
E. Data is unavailable so highest known value is used.

Population Impact Analysis

Levels of Vulture Take

For analysis purposes and to consider the scenario of additional requests, WS evaluated the impacts of a WS take of 1,000 black vultures and 500 turkey vultures in Virginia using eight different analyses. Multiple analyses are used because each analysis has its own strengths and weaknesses. Use of multiple analyses allows for the most

comprehensive review of potential impacts on vulture populations. As stated above, this level of harvest represents a worst-case scenario. It would not be necessary to sustain an annual take of 1,000 black and 500 turkey vultures to alleviate damage. WS also conducted analyses of the black and turkey vulture take for the last four years (2000 - 2003) (Tables 3 and 4).

WS initially conducted an analysis of removing 2,500 black and 1,500 turkey vultures in the January 2003 Decision and Finding of No Significant Impact and concluded the magnitude of take would be low based solely on population trends for both species. This analyses using population trends are referenced here and eight additional detailed population impact analyses follow.

Total take numbers for black and turkey vultures for 2000 – 2003 were obtained from the USFWS (unpub. data, August 2003, June 2004, and October 2004). Non-WS take during the theoretical year with WS take of 1000 black and 500 turkey vultures was determined by using the maximum yearly non-WS take from the period of 2000-2003.

Vultures are migratory, so actions on vultures in one state may have impacts on vulture populations in surrounding states. Therefore, this EA also analyzes the impact of the proposed action on the vulture population in Region 5. WS take data are for each state in Region 5 are combined with data on non-WS take provided by the USFWS to yield cumulative take (Table 5). For the theoretical year, WS take for states other than VA, and non-WS take were assumed to equal maximum yearly take for the period of 2000-2003.

Table 5. Legal black and turkey vulture take in Fish and Wildlife Service, Region 5, during fiscal years 2000 – 2003.

	Number of vultures taken by all in FY2003 [A,B]		Number of vultures taken by all in FY2002 [A,B]		Number of vultures taken by all in FY2001 [A,B]		Number of vultures taken by all in FY2000 [A,B]	
State	Black	Turkey	Black	Turkey	Black	Turkey	Black	Turkey
Virginia	431	19	441	70	192	135	106	36
Maryland	16	4	1	0	17	4	2	0
Delaware	0	n/a	0	0	0	0	0	0
West Virginia	1	1	2	4	0	0	0	0
Pennsylvania	0	n/a	2	4	0	2	0	0
New Jersey	0	n/a	17	0	8	9	n/a	n/a
New York	0	n/a	0	0	0	0	0	0
Connecticut	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rhode Island	n/a	5	n/a	n/a	n/a	n/a	n/a	n/a
Massachusetts	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vermont	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
New Hampshire	n/a	n/a	n/a	0	n/a	0	n/a	n/a
Maine	n/a	n/a	n/a	0	n/a	0	n/a	n/a

A. Data are from the Fish and Wildlife Service, unpub. data, October 2004.
B. n/a means not authorized.

1) Breeding Bird Survey

Population trend data were obtained using Breeding Bird Survey (BBS) data from the U.S. Geological Survey, Patuxent Wildlife Research Center (Sauer et al. 2003). The BBS is comprised of a set of over 3,500 roadside survey routes primarily covering the continental United States and southern Canada. Routes are surveyed each June by experienced birders. BBS data represent the best information currently available for monitoring trends in many bird species. In Region 5 of the U.S. Fish and Wildlife Service, trends calculated from the BBS indicate increases during the recent period of 1980-2002, with black vultures increasing annually at 11.9% (P=0.01) and

turkey vultures increasing annually at 4.5% (P<0.01). The estimated trends for individual states also show increases. In its analysis of turkey and black vulture populations in Virginia, the USFWS determined that, for the interval of 1980-2002, the black vulture population increased at a rate of 8.2% per year (P=0.17) and the turkey vulture population increased at a rate of 1.6% per year (P=0.20).

The primary objective of the BBS is to generate an estimate of population change (i.e., trends) for songbirds. Populations of birds tend to fluctuate, especially locally, as a result of variable annual local habitat and climatic conditions. Therefore statistical analyses are used to check for long-term trends in population data. Estimates of population trends from BBS data are derived primarily from route-regression analysis (Geissler and Sauer 1990) and are dependent upon a variety of assumptions (Link and Sauer 1998). The statistical significance of a trend for a given species is reflected in the calculated P-value (i.e., the probability of obtaining the observed data or more extreme data given that a hypothesis of no change is true). The level of statistical significance (e.g, 0.01, 0.05, 0.10, etc.) can vary and is often set by those conducting the analysis. Often BBS or other geographically large survey (e.g., Christmas Bird Count, Breeding Plot Survey) data are not statistically significant at the local level because of relatively smaller sample size (i.e., fewer routes surveyed), more routes with zero observations of a particular bird species which results in larger statistical variance, and low P-values set for statistical significance. The BBS has a statistical level of significance set at P<0.01. The BBS data show a statistically significant P-value for black and turkey vulture populations in Region 5 (the northeast and mid-Atlantic geographic area). However, the BBS data are not statistically significant at the Virginia level, nonetheless, Virginia trend numbers are used because it is the most appropriate dataset available.

Kiff (2000), Kirk and Mossman (1998), Peterjohn (1994), Carter et al. (2000), Link and Sauer (1998), and WS (*see* EA Section 4.1.1.1) determined that the Breeding Bird Survey and Christmas Bird Count survey instruments were appropriate for detecting broad population trends. WS feels the BBS and CBC are the most appropriate data to use for vulture population analysis because there is no definitive population estimate for vultures and these survey instruments allow us to monitor breeding and wintering vulture population trends.

The BBS and the CBC provide data for detecting broad population trends and not actual population counts. Vulture activity budget research by Coleman and Fraser (1989) underscore the importance of understanding that BBS and CBC provide trend data. Birds are counted by observers conducting BBS or CBC when the birds are seen or heard. Vultures usually are seen flying and are difficult for observers to see when perched in trees. Vultures make audible sounds that can be heard for very short distances of a few meters. Coleman and Fraser (1989) estimated that black vultures spent only 12% of the day flying in summer and 9% of the day flying during winter. Similarly, turkey vultures spent 33% of the day flying in summer and 27% of the day flying in winter. Summarily, a very small percent of the black and turkey vulture population is actually seen and counted during BBS and CBC. Any population indices calculated solely from BBS or CBC data (e.g., Partners in Flight population models) therefore would be very conservative since both surveys substantially undercount the number of vultures in the environment.

A more recent BBS analysis of black and turkey vulture populations in Virginia estimated that for the interval 1990 – 2002, the black vulture population increased at a rate of 14.3% per year (P=0.08)(Sauer et al. 2003). Turkey vultures were determined to be increasing at a rate of 4.55% per year (P=0.02) for the interval 1990 – 2002 (Sauer et al. 2003). Throughout Region 5, the black vulture rate of increase was 18.66% per year (P<0.01) and the turkey vulture rate of increase was 3.72% per year (P<0.01)(Sauer et al. 2003). WS conducted this more recent analysis of vulture population trends because the data are more reflective of current years than earlier data sets where the use of DDT and its derivative DDE affected vulture fecundity during the 1960's and 1970's (Kiff 2000, Buckley 1999, Coleman and Fraser 1989b, Kirk and Mossman 1998, Kiff et al. 1983, Wilbur 1978). Use of DDT was prohibited by the Environmental Protection Agency in 1972 (Johnston 1978).

BBS population trends can also be calculated for Bird Conservation Regions, which are the geographical units identified by the North American Bird Conservation Initiative for conservation planning and species assessment purposes (U.S. NABCI Committee 2000). Portions of three Bird Conservation Regions (BCR) occur in Virginia: Southeastern Coastal Plan, Piedmont, and Appalachian Mountains. For the period 1980 – 2002, black and turkey

vulture trends, respectively, were -0.3% (P=0.84) and 3.6% (P<0.01) in the Southeastern Coastal Plain; 8.5% (P=0.01) and 2.5% (P=0.06) in the Piedmont; and 15.2% (P=0.09) and 7.1% (P<0.01) in the Appalachian Mountains.

Turkey vultures were more abundant than black vultures in all states in Region 5 (Table 2) and this is reflected in BBS relative abundance numbers (Sauer et al. 2003) which are based on the numbers of birds seen per survey route. Relative abundance of each vulture species can also be calculated for each BCR (Sauer et al. 2003). The mean number of black and turkey vultures detected per BCR during the years 1990 – 1999 in Virginia was 0.52 in the Appalachian Mountains, 0.74 in the Piedmont, and 2.09 in the Southeastern Coastal Plain for black vultures; and 3.06 in the Appalachian Mountains, 3.33 in the Piedmont, and 7.98 in the Southeastern Coastal Plain for turkey vultures (Sauer et al. 2003).

Overall, the trend and relative abundance information indicates that populations of both vulture species have experienced long-term increases in the eastern U.S. as well as in Virginia, and that the rate of increase has been even greater during the last 20 years. Within Virginia, relative abundances of both vultures are greatest in the Southeastern Coastal Plain of the state, with smaller numbers in the Piedmont, and the lowest relative abundance in the Appalachian Mountains. Conversely, the relative population increase of vultures in the Appalachians has been at least double that in either of the other portions of the state. Black vultures have also increased at a relatively high rate in the Piedmont portion of the state compared to a relatively stable population level in the Southeastern Coastal Plain, while turkey vultures have been increasing at a relatively moderate rate in both the Piedmont and Southeastern Coast Plain sections of the state. Thus, even though the relative abundance of vultures is lower in the Appalachian Mountains and the Piedmont, these two areas of the state have experienced the largest proportional population increases, especially over the past 20 years and particularly for black vultures.

2) Christmas Bird Count Survey

Data from the National Audubon Society (NAS) Christmas Bird Count (CBC) were also checked for trends in vulture populations (NAS 2002). Kiff (2000), Kirk and Mossman (1998), Peterjohn (1994), Carter et al. (2000), Link and Sauer (1998), and WS (*see* EA Section 4.1.1.1) determined that the Breeding Bird Survey and Christmas Bird Count survey instruments were adequate for detecting broad population trends. We feel the BBS and CBC are the most appropriate data to use for vulture population analyses because there is no definitive population estimate for vultures and these survey instruments allow us to monitor breeding and wintering vulture population trends.

Analyses of 23 CBC sites in Virginia by WS where counts *have been performed annually* since 1988 indicate both turkey and black vultures have statistically significant increasing population trends (*see* September 2002 vulture EA at 4.1.1.1). The CBC measures bird population trends during winter.

3) Partners in Flight Population Index (400 meter observation distance)

Under the North American Bird Conservation Initiative (Rich et al. 2004), a conservation plan for landbirds was developed using a multi-variable equation, based on BBS data that adjusts BBS data for each species based on their differences in detectability. The multi-variable equation was then given one of six "accuracy ratings" that assessed the quality of the equation. The accuracy rating was "guesstimate" for black vultures and "fair" for turkey vultures. The USFWS used this technique to calculate a statewide population index for breeding black and turkey vultures in Virginia by assuming each BBS route covers an area of 25.1 km^2, and the relative abundance of black vultures is 0.76 per route, and that the relative abundance of turkey vultures is 4.40 per route for the 1998 – 2003 period (Memo to files, R. Dettmers, Land Bird Coordinator, USFWS, January 5, 2004; Rich et al. 2004; Rosenberg and Blancher *in press*). Virginia is approximately 105,590 km^2. Therefore, an index of the population would be 105,590 km^2 divided by 25.1 km^2 multiplied by the relative abundance (0.76 and 4.40). This calculation yielded an estimate to which the USFWS then applied correction factors for known biases in the BBS

methodology including a correction for temporal patterns in vulture activity (time of day correction factor: 2.61 for turkey vultures and 2.50 for black vultures), and for the fact that the survey probably often counts only one individual in a breeding pair (pair correction factor; Rich et al. 2004, Rosenberg and Blancher *in* press). Since vulture populations were increasing during the 1998 – 2003 period, the estimate was proportionally adjusted to reflect these increases. Using these correction factors yielded a minimum relative abundance estimate of 20,251 black vultures and 101,339 turkey vultures breeding in Virginia in 2003. These estimates of relative abundance only reflect the breeding population and birds greater than one year of age, and do not include offspring born that year, migrants, or potential decreases due to death, dispersal, or migration.

The time-of-day and pair correction factor are intended to help account for the differences in detection probabilities for vultures during the BBS (Rosenberg and Blancher, *in press*). While these two factors help improve the population estimation model, they need further evaluation and testing. This method of deriving population estimates from BBS relative abundance data can be used to provide a rough estimate of population size, however, the accuracy of the resulting estimates is difficult to assess (Memo to files, R. Dettmers, Land Bird Coordinator, USFWS, January 5, 2004). Thus, population estimates calculated by this method are most appropriately used as relative measures of population size for tracking relative population size over time (Memo to files, R. Dettmers, Land Bird Coordinator, USFWS, January 5, 2004).

The time-of-day correction factor addresses one bias of the BBS in surveying vultures (Rosenberg and Blancher, *in press*). However, vulture activity continues to increase from morning to afternoon. Bunn et al. (1995) recorded almost twice as many turkey vultures flying in the afternoon as during the morning in a series of roadside counts conducted in Pennsylvania. Not enough black vultures were seen to make any comparisons. Because the BBS only contains observations from the morning, it is likely that large portions of the population are undetected by the survey and so a larger correction factor should be applied (M. Avery. NWRC, pers. commun.).

The pair correction factor addresses another bias of the BBS in surveying vultures (Rosenberg and Blancher, *in press*). The assumption that each bird detected actually represents a pair of birds is simplistic and unfounded. Nonetheless, this method is popular among some persons in the birding community. The best information available indicates that black vultures do not breed until they are 8 years old. Even if that estimate is off by a few years, numerous non-breeding birds will be in the population during each breeding season. The same applies to turkey vultures. The proportion of non-breeders for either species is unknown, but it is certain that each vulture detected is not half of a breeding pair. Thus, the correction factor should be somewhat less than 2 (M. Avery. NWRC, pers. commun.).

Analysis of PIF Population Index (400 meter observation distance) – WS and NWRC used an exponential growth equation to verify this population index methodology by back calculating to a year when CBC data could be used to verify PIF population index (400 meter detection distance) methodology. The exponential growth equation is:

$$N_0 = N_t / e^{rt}$$

where, N_t is the vulture population index in the year of interest, N_0 is the vulture population index in the initial year, r is the rate of growth from BBS data (1980 – 2002), and t is the time in years (Caughley 1977). The constant "*e*" is the base of natural (equals Naperian) logs, taking the value 2.71828 (Caughley 1977). The year 1980 is a baseline year established by the U.S. Geological Survey for analysis of migratory bird population trends. CBC count data from 1980 in Virginia is used to verify the PIF population index. Thus:

$$N_0 = N_t / e^{rt} \longrightarrow N_{1980} = N_{2002} / e^{(0.082)(22)}$$

$$N_{1980} = 20{,}251 / 6.07$$

$N_{1980} = 3,336$

Using PIF population index (400 meter detection area distance) produces a population index of 20,251 black vultures in 2002 in Virginia (Memo to files, R. Dettmers, USFWS, January 5, 2004). A back calculation of this 2002 population index using an exponential growth equation results in a 1980 population index of 3,336 black vultures in Virginia. During the CBC count for 1980, a total of 1,759 black vultures were counted. The CBC count in 1980 represented about 16% of the land area in Virginia. Obviously, there were more black vultures in the whole of Virginia than the 1,759 counted during the CBC survey. At least this 1980 PIF population index using 400 meter detection distance exceeds the number of black vultures counted during the CBC survey (3,336 vs. 1,759). This analysis provides verification sought by Rosenburg and Blancher, *in press*, and may indicate that the PIF population index (400 meter detection distance) provides a more reasonable population index than similar PIF population index models using an 800 meter detection distance (see number 7, PIF Population Index [800 meter observation distance]). Also, this analysis yields a more comparable estimate of the breeding black vulture population in 1980, at least relative to CBC data.

Proportion of black vulture population detected during CBC - The CBC surveyed vultures across about 16% of the land area of Virginia in 1980 or about 6,362 square miles. Black vultures were detected in 24 of 36 count circles. The CBC only counted a portion of the total number of black vultures wintering in Virginia. It is possible to determine the proportion of the black vulture population counted by looking at the ratio of black vultures counted in the CBC in 1980 and 2002 and comparing to exponential growth equations (Table 6).

The exponential growth equation was used to calculate the 2002 black vulture population index from 1980 CBC count data. The rate of annual growth for the period was 8.2%. A total of 1,759 black vultures were counted in 1980 on the CBC in Virginia, a count that occurred on about 16% of the land area of the state. The 2002 black vulture population index provided an estimate of 10,677. The actual number of black vultures counted in 2002 during the CBC was 2,638. The proportion of black vultures not represented by the CBC data: roughly 3 black vultures are not counted for every 1 counted (2,638 counted, 8039 not counted equals population of 10,667). If the same 3:1 proportion is applied to the 1980 CBC count, then the initial population index becomes 1759/0.25 = 7,036 black vultures. If this adjusted black vulture population index is used in the exponential growth equation, the black vulture population estimate for 2002 now becomes 42,709.

Table 6. Proportion of the black vulture population counted during the Christmas Bird Count Surveys in Virginia and comparison of these proportions using exponential growth equation. The number of black vultures counted occurred on 16% of the land area of Virginia.

Year	Number of black vultures counted on Christmas Bird Count Survey (CBC)	Population index calculated from exponential growth equation	Proportion of vultures actually counted on CBC compared to exponential growth equation	Population index calculated after applying 1:3 proportion of counted (CBC data) to calculated (growth equation)	Population index calculated from exponential growth equation using 1:3 proportion data for 1980
1980	1,759	-	-	1,759/0.25 = 7,036	-
2002	2,638	10,677	1:3	-	42,709

4) Christmas Bird Count Population Index (National Wildlife Research Center [NWRC] analysis) for black vultures

The NWRC calculated a population index using Christmas Bird Count data and a similar protocol as the PIF population index as described by Rosenburg and Blancher (in press) and number 3 above. The analysis will not be presented again, only the summary. The 2002 population index for black vultures was calculated at 10,677 birds over about 16% of Virginia's land area. When this data is adjusted for the proportion of black vultures actual not represented in the CBC, then the 2002 population index of black vultures is 42,709 birds on 16% of Virginia's land area.

5) PIF Land Bird Conservation Plan Analysis

The North American Land Bird Conservation Plan provides a continental synthesis of priorities and objectives that will guide land bird conservation actions at national and international scales (Rich et al. 2004). The plan was developed by Partners in Flight, a consortium of state and federal agencies, organizations, and businesses. The scope of the plan is the 448 native land birds that breed in the U.S. and Canada. Of these species, 100 are on the "Watch" list and 28 species require immediate action to protect small remaining populations and 44 species require management action to reverse long term declining trends. Also, 92 of the 448 landbird species are on the "Stewardship" list because their range is confined to a single Avifaunal Biome. Neither black nor turkey vultures are on the "Watch" or "Stewardship" lists of the plan because threats to the populations, breeding populations, non-breeding populations, and population trends are characterized as low.

Partners in Flight used a species assessment process to identify priority species (Carter et al. 2000) using scores generated by the Rocky Mountain Bird Observatory. This approach assessed species on the basis of seven measures of conservation vulnerability. The measures of vulnerability were: 1) threats to breeding populations, 2) area importance, 3) population trend, 4) relative abundance, 5) breeding distribution, 6) non-breeding distribution, and 7) threats to non-breeding populations. Each measure of vulnerability is ranked from 1 (low concern or importance) to 5 (high concern or importance). A measure of overall conservation priority ranked from 5 – 25 is also assigned by summing five of the seven measures of conservation vulnerability (Rich et al. 2004). This overall conservation assessment process can identify species that are particularly threatened or are of high stewardship importance (Panjabi 2001). This assessment process also identifies species that are common and in low need for conservation.

The "Watch List" is one outcome of the assessment process and is an early warning system for bird species at risk (Panjabi 2001). The Watch List totals the scores of all measures of vulnerability except area importance. Bird species whose overall conservation score is $\geq$ 19 and are not listed under the Endangered Species Act are placed on the Watch List (Panjabi 2001). Bird species with a score $\geq$ 23 are listed as Extremely High Priority.

Black and turkey vultures were evaluated as part of the North American Landbird Conservation Plan. Both species were scored as common and of very low risk. Black vultures had an overall conservation score of 5 out of 25. Turkey vultures had an overall conservation score of 6 out of 25. These scores are comparable to other common birds such as American crow, hairy woodpeckers, mourning dove, American robins, northern cardinals, resident populations of Canada geese, double-crested cormorants, European starlings, house sparrows, and rock pigeons.

6) PIF Land Bird Population Objectives

The USFWS has set no formal population objectives for black or turkey vultures. PIF has set population objectives for 192 land bird species of continental importance with the late 1960's as the baseline year (Rich et al. 2004). Since the USFWS has set no population objective and PIF is setting population objectives with the late 1960's as the baseline, it is logical to use the late 1960's as the baseline for vultures. The best available information indicates the black vulture population in USFWS Region 5 is 255% larger than what it was in 1966, based on Breeding Bird Survey of 9.1% annual increase (P=.01) from 1966 to 2002. The turkey vulture population in Fish and Wildlife Service Region 5 is 110% larger than what it was in 1966, based on Breeding Bird Survey of 3.9% annual increase (P<.01) from 1966 to 2002 (Sauer et al. 2003).

Wildlife Services has chosen a more recent baseline year (i.e., 1980) for black and turkey vulture populations in Virginia than PIF for three reasons. The first reason is the impacts DDT and its derivative DDE had on vulture fecundity in the 1960's and 1970's (Kiff 2000, Buckley 1999). DDT was banned by the Environmental Protection Agency in 1972 (Johnson 1978). The second reason is that 1980, is the starting year for one of the two commonly reported periods of BBS trend information and trend statistics have already been calculated and

reported by the U.S. Geological Survey. The third reason is Bart et al. (2004) conducted a statistical analysis using trend data to detect changes in land bird populations and determined that data sets must be at least of 20 years duration to detect change. Therefore, to use BBS, CBC, or other trend data we must analyze at least 20 years of data which sets the earliest baseline year as 1983. These three reasons support the use of 1980 as the baseline year for vulture populations.

The best available information indicates the black vulture population in USFWS Region 5 is 147% larger than in 1980, based on Breeding Bird Survey of 11.3% annual increase (P=0.00) from 1980 to 2003 (Sauer et al. 2004). In Virginia, the black vulture population is 117% larger than in 1980 (Sauer et al. 2004). The turkey vulture population in USFWS Region 5 is 59% larger than in 1980, based on Breeding Bird Survey of 4.5% annual increase (P=0.00) from 1980 to 2003 (Sauer et al. 2004). In Virginia, the turkey vulture population is 35% larger than in 1980 (Sauer et al. 2004).

Thus, in the absence of a formal population objective for black or turkey vultures by the USFWS, and PIF determining the overall conservation priority is low (Rich et al. 2004), WS has determined that lethal removal of black or turkey vultures would not result in a significant adverse impact on the quality of the human environment as long as viable populations continue to exist. A viable population is one that can maintain itself or increase in number. We know, based on the statistically significant increasing trends shown by the BBS surveys, that the population of black and turkey vultures in 1966, and later in 1980, were viable. These populations were viable because they subsequently increased.

The regional black vulture population is 147% larger than it was in 1980. We know from BBS trend data that this population could decline to the 1980 level and still be viable. We also know that this population could decline to the 1966 level and still be viable, based on increasing population trends since 1966. The regional turkey vulture population has increased by 59% since 1980 and the same conclusion about the viability of its population is also true.

Using this conservative approach with 1980 as the baseline viable black and turkey vulture population, the population would have to decline from its current level by twelve thirteenths, or more than 92% before we would begin to be concerned about future viability. The USFWS used PIF Population Index (*see* number 3 above) to calculate a 2003 breeding population of 20,251 black vultures and 101,339 turkey vultures (Memo to files, R. Dettmer, USFWS, January 5, 2004). Ninety-two percent of a conservative PIF population index would be 18,631 black vultures and 93,232 turkey vultures. The USFWS could permit take of 92% of the 2003 vulture population before it would necessitate re-evaluation due to developing concerns about population viability.

However, WS believes it would unnecessary to remove more than 1,000 black vultures or 500 turkey vultures in any one year in Virginia. Our analyses indicate that this level of take would not reduce the population and would certainly not even come close to reducing the population to the 1980 level. WS would monitor the level of take against available trend data in subsequent years to determine the extent of any population increase or decline. Should the population decline to an extent that suggests the 1980 baseline level has been breached, then WS would re-evaluate to determine if further analysis and conclusions, or mitigation measures, might be warranted.

7) Partners in Flight Population Index (800 meter observation distance)

The USFWS used PIF methodology as described in number 3 above and a *detection area correction factor* revised by PIF in March 2004 (Memo to Files, R. Dettmers, USFWS, April 5, 2004). The revised *detection area correction factor* was meant to incorporate the distance which a bird species moves during a 3-minute BBS count period. Vultures were originally assigned a detection area correction factor of 400 meters and this was changed to 800 meters by PIF. This quadrupled the detection area. We present this 800 meter analysis because PIF has started using this analysis and Rosenburg and Blancher, *in press*, call for verification of this methodology. WS analysis uses independent CBC data to demonstrate that the change to 800 meters detection distance results in an illogical population index as the raw CBC data is larger than the PIF population index.

The PIF population index (800 meter observation distance) is derived from BBS data which requires recording vultures observed within 400 meters of an observation point. The PIF population index (800 meter observation distance) assumes vultures are seen to 800 meters. This is a false assumption as BBS observers are unable to even observe vultures to 400 meters in the eastern forests (R. Fernald, VDGIF, pers. commun.). Also, the BBS protocol requires vultures observed to 400 meters are recorded and those beyond 400 meters are ignored, therefore the PIF population index (800 meter detection distance) violates BBS protocol and assumptions in calculating an index for an 800 meter observation distance.

When using this detection area correction factor, the PIF system assumes that the effective detection distance for vultures at BBS stops is 800 meters, which equates to a sampled area of 2.0106 km^2 per stop. However, BBS stops are located 800 meters apart, which results in overlapping sample areas based on an 800-meter detection distance per point. Taking into account this overlap in area sampled by each point using an 800-meter observation radius, each BBS route (i.e., 50 stops spaced 0.5 miles apart) samples an area of roughly 65 km^2 of heterogeneous landscape. If we take the relative abundance numbers from BBS for Virginia (i.e., mean number of birds detected per route in Virginia) as an estimate of the number of individuals per 65 km^2 across the state, then we can divide the land area of the state (in km^2) by 65, multiple this number by the relative abundance of each species, and then apply the time-of-day and pair correction factors to calculate a rough estimate of the species' population within the state. Virginia is approximately 105,590 km^2, and the time-of-day correction factors for turkey vultures and black vultures are 2.61 and 2.50, respectively. We use BBS relative abundance numbers for the years 1998-2002 to represent the average population level over the last 5 years. In Virginia, these numbers are 4.40 for turkey vultures and 0.76 for black vultures. Using these numbers, the rough state-wide population estimates are 37,311 turkey vultures and 6,173 black vultures in Virginia.

With the relative abundance numbers used in the calculation representing an average over 5 years, these population estimates can be thought of as an average population size over the last 5 years. However, because the populations have been increasing in Virginia, it would also be appropriate to add an increase to these numbers proportionate to what the annual percent increase reported by the BBS has been. If we assume that the 5-year average estimates represent the population numbers in the year 2000 (the mid-point of the period 1998-2003) and add an 8.2% annual increase for black vultures and a 1.6% annual increase for turkey vultures for three years, the results would yield an estimate of the 2003 breeding population. These calculations produce estimates of 39,131 turkey vultures and 7,819 black vultures in Virginia. Because these estimates are based on numbers from the BBS, which surveys birds during the breeding season, these numbers only reflect what the breeding population might be. Populations at other times of the year will differ because of increases to the population from offspring produced during the breeding season and migrants from other parts of the species' range, as well as decreases from deaths and dispersal or migration of breeding individuals to other parts of the species' range.

Analysis of PIF Population Index (800 meter observation distance) – As with the PIF population index (400 meter observation distance), WS and NWRC used an exponential growth equation to verify this population index methodology by back calculating to a year when CBC data could be used to verify PIF 800 meter detection distance methodology. The exponential growth equation is:

$$N_0 = N_t / e^{rt}$$

where, N_t is the vulture population index in the year of interest, N_0 is the vulture population index in the initial year, r is the rate of growth from BBS data (1980 – 2002), and t is the time in years. The constant "*e*" is the base of natural (equal Naperian) logs, taking the value 2.71828 (Caughley 1977). CBC count data from 1980 in Virginia is used to verify the PIF population index. Thus:

$$N_0 = N_t / e^{rt} \longrightarrow N_{1980} = N_{2002} / e^{(0.082)(22)}$$

$$N_{1980} = 6,173 / 6.07$$

$N_{1980} = 1{,}017$

Using PIF population index (800 meter detection area distance) produces a population index of 6,173 black vultures in 2002 in Virginia (Memo to files, R. Dettmers, USFWS, July 22, 2004). A back calculation of this 2002 population index using an exponential growth equation results in a 1980 population index of 1,017 black vultures in Virginia. This is interesting because in the CBC count for 1980, a total of 1,759 black vultures were counted. The CBC count in 1980 represented about 16% of the land area in Virginia. Obviously, there were more black vultures in the whole of Virginia than the 1,759 counted during the CBC count and this analysis provides verification sought by Rosenburg and Blancher, in press. The PIF population Index (800 meter detection area distance) produces illogical results and will not be used in this environmental assessment.

8) Christmas Bird Count population index (VDGIF and College of William and Mary analysis)

A review of the vulture population estimates for Virginia derived through the PIF methodology using 800 meter detection distances provided several lines of evidence suggesting that the PIF estimates might represent an underestimate of the true number of vultures currently found in Virginia (Memo to files, R. Dettmer, USFWS, July 22, 2004). The Virginia Department of Game and Inland Fisheries (VDGIF) and the College of William and Mary analyzed Christmas Bird Count data to calculate a population index.

The numbers of vultures counted on CBC surveys in Virginia were used to develop an independent estimate of vulture populations for the state by Mike Wilson, with the VDGIF, and Dr. Bryan Watts, at the College of William and Mary (see Wilson and Watts, Interagency Memo, July 14, 2004). Within each of the three physiographic provinces of the state (i.e., coastal plain, piedmont, ridge and valley), Wilson and Watts converted the number of vultures counted on CBC surveys into mean densities (birds/km^2), multiplied the mean densities by the total land area of the respective province, and then summed across all provinces to produce a statewide estimate. This method produced estimates of 16,119 black vultures and 40,412 turkey vultures in Virginia. Like the PIF method, this method of population estimation is based on several untested assumptions (e.g., CBC surveys are a representative sample of each physiographic province, CBC surveys are an accurate count of the birds in each CBC circle) and therefore the accuracy of this method for providing a true population estimate is unknown. Wilson and Watts also point out that estimates derived from BBS and CBC data are not directly comparable because the two surveys are conducted at different times of the year and use different methods to collect data. CBC data count vultures wintering in the state of Virginia, while the BBS data addresses the breeding population.

Summary of Population Impact Analysis

We present eight different analyses of the impact on the black and turkey vulture populations in Virginia. One of the eight analyses was rejected because its conclusion was illogical. All of the analyses were based on BBS and/or CBC data in several different formats.

The BBS method of assessing the impacts of WS take and total take on the vulture population used the population trend evaluation in number 1 which determined that the black vulture population in Virginia was increasing at a rate of 8.2% per year and that the turkey vulture population was increasing at a rate of 1.6% per year during the 1998 – 2002 period (Table 3 and 4). If WS take and total take were less than the number of vultures that were predicted to be added to the population annually (annual recruitment) then these factors would not cause a decline in the vulture population even if WS and other known forms of take occurred in addition to natural mortality (i.e., additive mortality). When the PIF Population Index (400 meter area detection distance) was used, the number of vultures removed by WS was always less than estimated annual recruitment. Therefore, we conclude that the impact on black and turkey vulture populations in Virginia would be low, even if WS were to remove 1,000 black vultures or 500 turkey vultures (Table 3 and 4).

Several analyses are presented using CBC data where CBC data are used in exponential growth equations to

calculate 2002 black vulture population indexes from actual count data. These data are presented in adjusted and unadjusted population indexes of 42,709 black vultures and 10,677 black vultures on about 16% of Virginia's land area (number 3 and 4). Another analysis of CBC data adjusted the data for differing vulture densities among the three physiographic regions in Virginia (number 8). This analysis produced population indexes of 16,119 black vultures and 40,412 turkey vultures in 2004.

PIF conducted an analysis of land bird populations to identify those most vulnerable to decline. This analysis determined that black and turkey vultures in North America were some of the most secure among all land bird species (number 5).

A final analysis set a baseline year of 1980 for viable black and turkey vulture populations (number 6). This methodology allowed comparison and monitoring of BBS trend data against a baseline. During the time period of 1980 through 2003, black vulture populations increased 117% and turkey vulture populations increased 35%. This was the easiest analysis to make and demonstrated that a take of 1,000 black vultures and 500 turkey vultures would have no significant impact on either population.

CUMULATIVE IMPACT ANALYSIS

No significant cumulative environmental impacts are expected from any of the 5 alternatives. Under the Proposed Action and Alternative 4, the lethal removal of vultures would not have a significant impact on overall vulture populations in Virginia, USFWS Region 5, or the United States, but some short term local reductions may occur. Under Alternative 2 and 5, there could be an increased take of vultures compared to Alternative 1, 3, and 4 because WS would provide no information or expertise about lethal take. However, this increased level of take would be expected to have no significant impact. Local reductions that may occur would be temporary.

Overall, the trend and relative abundance information indicates that populations of both vulture species have experienced long-term increases in the eastern U.S. as well as in Virginia, and that the rate of increase has been even greater during the last 20 years (Memo to file, R. Dettmer, USFWS, January 5, 2004). Within Virginia, relative abundances of both vulture species are greatest in the Southeastern Coastal Plain portion of the state, with smaller numbers in the Piedmont region, and the lowest relative abundance in the Appalachian Mountains (Memo to file, R. Dettmer, USFWS, January 5, 2004). Conversely, the relative population increases of both vulture species in the Appalachian Mountains has been at least double that in either of the other portions of Virginia (Memo to file, R. Dettmer, USFWS, January 5, 2004). Black vultures have also increased at a relatively high rate in the piedmont portion of the state compared to a relatively stable population level in the Southeastern Coastal Plain, while turkey vultures have been increasing at a relatively moderate rate in both the Piedmont and Southeastern Coastal Plain sections of Virginia (Memo to file, R. Dettmer, USFWS, January 5, 2004). Thus, even though the relative abundance of black and turkey vultures is lower in the Appalachian Mountains and the piedmont, these two areas of Virginia have experienced the largest proportional population increases, especially over the last 20 years and particularly for black vultures (Memo to file, R. Dettmer, USFWS, January 5, 2004).

No risk to public safety is expected when WS's assistance is provided to requesting individuals in Alternatives 1 and 4, since only trained and experienced wildlife biologists/specialists would conduct and recommend VDM activities. There is a slight increased risk to public safety when VDM activities are conducted by persons that reject WS assistance and recommendations in Alternatives 1, 2, 3, and 4, and when no WS assistance is provided in Alternative 5. Also, there would be a slight increased risk to public safety in Alternative 2 because WS would provide no assistance with nonlethal methods. In all 5 Alternatives, however, the extent of these risks would not be significant.

The EA also analyzed the impacts on three other issues in addition to effects on target bird populations and effects on human health and safety. These issues were 1) effects on nontarget wildlife species populations, including T&E species, 2) effects on aesthetics, and 3) humaneness of lethal bird control methods. The analysis of impacts on those issues contained in the September 2002 EA are still the same, therefore, this amendment to the EA needs no further revision.

Although some persons and organizations will likely be opposed to WS's participation in VDM activities to protect property, livestock, pets, human health and safety, and agricultural resources from vulture damage, the analysis in this EA indicates that WS Integrated VDM program will not result in significant cumulative adverse impacts on the quality of the human environment.

APPENDIX A

Response to Comments, Information, and Concerns on the Environmental Assessment for the

MANAGEMENT OF VULTURE DAMAGE IN THE COMMONWEALTH OF VIRGINIA

WS received 120 comment letters from the public involvement process and review of the pre-decisional environmental assessment (EA). The National Environmental Policy Act (NEPA) requires that proper consideration be given to all reasonable points of view, particularly as they may relate to the issues being considered. In this light, it is important to consider and address concerns or criticisms that may arise, including those comments that arrive after the completion of the FONSI. After the public comment period on the EA some organizations and two professors presented further comments, requests for information, and concerns. One environmental organization initiated an email campaign in June 2003, instructing its members to oppose the vulture damage management program, and the WS program responded in writing to over 600 members who commented about the vulture EA. The WS program also met with one professor and several organizations to share information and discuss concerns. Appendix A is a summary of comments, information, and concerns that were discussed at a June 27, 2003, meeting and the corresponding WS responses.

Public involvement under provisions of NEPA is intended to gather substantive information and ideas from the public on proposed federal actions in order to help managers make better decisions. The public involvement process is not counting votes supporting or opposing management actions. While quantitative information is gathered and is important to assessing attitudes, that is only part of the information analyzed.

Issue 1: **The WS program should use methods such as eliminating food resources, rather than population reduction to reduce or stop damage at a recreation area in central Virginia.**

Program Response: This vulture problem is described in the EA in section 1.3.7.3. This roost has occurred since about 1999. We originally estimated 450 black vultures roosted there in August 2002. More information since then indicated an estimate of 570 black vultures was more accurate. The damage was primarily to vehicles and boat trailers. The damage also included declining public use by fishermen and visitors due to concern about property damage to vehicles. Some businesses have suffered financial hardship due to lost revenue because fewer fishermen and others use the area. One business reported a 15% loss in annual sales due to vultures deterring fishermen from using the recreation area. Some vehicle owners have sustained more than $5,000 in damage from black vultures. Some fishermen and sponsors pulled out of a nationally recognized bass fishing tournament the last week of August 2003 due to vulture damage to boats and vehicles.

The county, WS, and others have tried managing the vultures using an integrated wildlife damage management program since 1999. This program included stopping an individual feeding about 100 pounds of dog food per day to vultures; harassing vultures with pyrotechnics, propane cannons, distress calls; shooting a few vultures to reinforce harassment; chasing vultures with cars; placing nixalite porcupine wire on lamp and sign posts to discourage roosting and loafing, and erecting signs warning the public about potential vulture damage to vehicles and signs telling the public not to feed the wildlife. Some patrons to the boat launch have covered their vehicles with tarps only to have the black vultures tear and shred the tarps. In August 2002, WS reduced the vulture population by trapping and euthanizing 371 black vultures after consulting with the USFWS and VDGIF. This left about 200 vultures which dwindled to 50 and then sporadic visits until March 2003. Damage to vehicles practically ceased for six months after the population reduction.

The vulture damage returned in March 2003 when the vultures re-established the roost. The county initiated another integrated harassment program with adjacent property owners, fishermen, and volunteers. The roost was finally dispersed in April after two weeks effort. The roost reformed in July 2003 and the damage to vehicles by 200 black vultures started again. While 200 vultures roosted there, only an estimated 100 vultures could be seen at any one time in the parking lot damaging vehicles or loafing in late August 2003.

In late August and September 2003 an integrated wildlife damage management program was started again to disperse about 200 black vultures roosting at the recreation area. The National Wildlife Research Center conducted research on a new method to disperse vultures using vulture effigies (Avery et al. 2002, Tillman et al. 2002). Effigies and traditional bird dispersal techniques were also used. WS worked with the county and adjacent landowners to install plastic vulture effigies at roost sites and dead vulture effigies at loafing sites. Some vultures loafed within five feet of the dead vulture effigies. Also, traditional methods such as pyrotechnics, propane cannons, distress calls, and shooting a few vultures to reinforce harassment were used to harass the vultures. The roost dispersal effort was unsuccessful. Damage to vehicles and lost revenue to a local store continued. WS was again asked to reduce the local black vulture population causing damage to vehicles because a chronic problem persisted after an additional two integrated harassment campaigns in 2003. There were about 270 vultures roosting at the recreation area in early December 2003.

Some people and organizations at the June 27, 2003, meeting between WS and several environmental and animal interest organizations believed eliminating artificial or man-caused foods would disperse the vulture roost at the recreation area. The diet of vultures has been studied by Coleman and Fraser (1987), Yahner et al. (1990), and Patterson (1984). These authors at times found a high incidence of domestic livestock and poultry, small mammals (rodents), deer, and mid-size mammals (opossum, cat, rabbit, squirrel), animal feces, and plant material in pellets. The diet of vultures is highly variable and WS analyzed possible food resources around the recreation area.

Black and turkey vultures do not move randomly over the landscape but remain in large home ranges (Coleman and Fraser 1989). Black vulture home ranges averaged 14,881 hectares (36,756 acres) in Pennsylvania and Maryland and turkey vulture home ranges averaged 37,072 hectares (91,568 acres) (Coleman and Fraser 1989). Additionally, vultures were found clumped in distribution around roost and feeding sites (Coleman and Fraser 1989). Ninety-five percent of all vulture movements were within 15 km (9.3 miles) of the roost (Coleman and Fraser 1989).

WS re-evaluated the availability of artificial or man-caused food resources within 10 miles of the recreation area. There is one landfill and a trash transfer station approximately 7.4 miles from the recreation area. No vultures have ever been seen at the trash transfer station. The number of vultures seen at the landfill in August ranges from 0 to 5 per day. The landfill may have up to 20 vultures per day in the winter. The landfill and trash transfer station in an adjacent county are about 17 miles from the recreation area and most likely outside the home range of the black vultures.

Coleman and Fraser (1989) reported that vulture use of road killed animals amounted to less than 2% of vulture feeding bouts. WS personnel see road killed animals in the county. However, Virginia Department of Transportation workers remove dead animals from state and county roads and rights of way. Few of these road killed animals have been seen being fed upon by vultures.

Some people accused fisherman of leaving carcasses and food items at the recreation area which attracted and fed the vultures. We have observed no fish carcasses there. The county government maintains trash receptacles at the recreation area and we have observed no food items around the trash receptacles or boat landing. Some people have blamed the cat colony for attracting the vultures. We have observed the cats but no cat food on the ground or in bowls. The women feeding the cats claim they only put out enough food to feed the cats and they remove any left over feed. The county erected signs prohibiting the feeding of animals or abandoning animals at the recreation area in 2003.

The occurrence of domestic farm animals found in vulture diet studies reflect local agriculture and carcass disposal practices in use at that time. It is standard agricultural practice in Virginia to dispose of dead livestock by burial, incineration, or rendering. Poultry are required by state law to be buried, incinerated, composted, or rendered. There are very few agricultural operations near the recreation area. The county had about 2,600 cattle in the county in 2002, which represented less than 2/10ths of 1% of the state total. The county is ranked 77th in cattle production and 72nd in beef

production out of 101 counties in Virginia (Barnes and Mueller 2003).

The diet of vultures changes throughout the year and by location depending on the type of carrion or food resources available. It is possible that mowing makes small mammals available for vultures. For example, small mammals (e.g. field mice) were found in 0 – 73% of vulture pellets among seven different roosts in Maryland and Pennsylvania (Yahner et al.1990). Patterson (1984) reported voles and moles regularly eaten by turkey vultures during the fall at the Radford Army Arsenal in Virginia. There are many large hay fields and fields associated with industrial sites near the recreation area and vultures are sometimes seen in these fields.

Fragmentation of the landscape by man has aided vultures in finding food resources (Coleman and Fraser 1989, Kiff 2000). WS investigated and considered artificial and man-caused food resources that may attract or support the vultures roosting at the recreation area. There appears to be no artificial or man-caused food resources that attracts or holds the vultures there. It appears a diversity of natural and some artificial and man-caused food resources support the vultures roosting at the recreation area. We believe it is the characteristics of the roost site and not food resources that attract vultures to roost at this site.

An environmental organization requested that their vulture expert be allowed to make a site visit to the recreation area to identify food resources used by the vultures. WS agreed to this request and a letter, email, and several phone calls were made in August and September 2003 inviting this individual. To our knowledge, he had not visited the site as of October 2004.

Issue 2: **WS should find alternative non-lethal ways of alleviating vulture predation on livestock and urban/suburban vulture damage associated with the Radford vulture roost.**

Wildlife Services Program and Fish and Wildlife Service Response: The vulture roost in Radford, Virginia has a 30 year history of black vultures preying on cattle and sheep produced within seven miles of the roost site. Also, the black and turkey vultures have been shifting all or part of the roost from the Radford Army Arsenal into suburbs of Radford for the last 4 years during December and January. This roost is one of the largest vulture roosts in Virginia with over 1,300 vultures. The Radford roost vulture problem is identified in the environmental assessment in section 1.3.7.7.

A brief summary of the problem is at least 18 cattle and 2 sheep farms were impacted by this roost. These producers raise from 49 to 400 head of adult cattle (not including calves) and from 400 to 1,000 sheep annually on the respective farms. Beef cattle and sheep are raised on pasture because raising these animals inside buildings creates disease problems and is not economically feasible. These farms have reported 3 cows killed, 1 cow injured, 122 calves killed, 2 calves injured, and 145 lambs killed by black vultures from 1995 through 2001. Not all farmers report their losses to the federal government so the actual losses are higher than reported losses.

The urban/suburban public in Radford has been harmed by strong ammonia odors emanating from the vulture roost, the white wash effect from many vultures defecating in a small area, loss of use of yards due to extreme odor and feces, and the time and cost to clean personal property and cars of vulture feces and vomit when the roost moved from the Radford Arsenal to the Town of Radford over the last 4 years. The Town of Radford has been burdoned with the annual cost to its police and animal control officers attempting to disperse the roost for months each winter. The vulture roost moved from the arsenal to the town on its own and was not dispersed by personnel at the arsenal as some environmentalist claimed.

Environmental and animal interest organizations initially wanted the farmers to change agricultural practices to avoid killing or harassing the vultures. They have specifically asked the farmers to put their cattle inside buildings, not harass the vultures with pyrotechnics or other devices that would disperse the vulture roosts, and to spend more time on the farm tending the cattle and sheep. The farmers want the number of black vultures reduced to a level where predation on livestock is less common. An estimated 900 black vultures and about 400 turkey vultures comprised the roost in January/February 2003. The farmers requested the number of black vultures be reduced by half and stated that turkey vultures were not a threat to livestock production.

This conflict became more complicated and affected a greater diversity of people when the black and turkey vultures roosting at the Radford Army Arsenal shifted each winter of the last 4 years to the suburbs of Radford. In late 2002 and early 2003 about 500 black and turkey vultures roosted in or adjacent to suburbs in Radford. As of early December 2003, Radford Animal Control officers report about 1,000 vultures in four roosts were in Radford. Animal Control officers were actively harassing the vultures with pyrotechnics in December 2003 to disperse the estimated 1,000 black and turkey vultures out of town.

When political support developed in early 2003, to reduce the number of black vultures by half, environmental organizations offered to pressure the USFWS to expedite permits to allow the legal take of black vultures to protect livestock. Some wildlife biologists with the Virginia Chapter of the Wildlife Society at their annual spring meeting in 2003, suggested one permit should be issued to authorize all livestock producers near the Radford roost to take black vultures to protect livestock. However, the migratory bird permit regulations require that permits be issued only to a "person" as defined at 50 CFR 13.21 and 10.12 after receiving a proper application. The farmers have been requesting the USFWS issue a depredation order allowing the take of black vultures to protect livestock since 1995 and the Service has not acted on this idea because they need to do more population assessment before moving forward with a Depredation Order and livestock producers in Florida and Texas are affected by similar black vulture predation issues and the USFWS would want to consider a Depredation Order beyond Virginia.

The take of black vultures is authorized when a migratory bird depredation permit is issued by the USFWS. However, farmers and public that have tried using the migratory bird depredation permit system have expressed to WS a loss of faith in the federal government to deliver the permits because the permits currently take 4-6 months to be processed. In response, the USFWS has expedited the processing of all permit applications to take black vultures causing damage to livestock by placing these requests ahead of others. Current processing time is now typically less than one month.

Other permitting issues that have caused difficulties include permits sometimes prohibit the use of rifles as the most effective means to take vultures. Accordingly, the USFWS has continued to authorize the use of rifles in rural farming areas, but has restricted the use of rifles in urban or suburban areas where vultures roost in order to protect human safety. Local ordinances frequently further restrict the use of firearms in urban and suburban areas, which is beyond the control of the USFWS. Restrictions on the numbers of vultures that can be killed are sometimes believed to be inadequate to stop predation on livestock. In these cases, the permittee may request an amendment to their permit to increase the number of vultures authorized to be taken, and the USFWS will issue an amended permit, pending concurrence by the Virginia Department of Game and Inland Fisheries.

The permitting process has also been reported by users as unfriendly and simply a paperwork burden to satisfy the legal requirements which Federal agencies must comply. The USFWS has been steadily streamlining application and reporting requirements since 1996, but must ask applicants for adequate information, as required by the regulations, to process a permit request. The USFWS has also been complying with the Paperwork Reduction Act, and must submit all forms through the Federal Office of Management and Budget, which reviews forms to ensure that only essential information is requested and that forms are simple to use.

Applicants for depredation permits have also expressed dismay that they must submit $25 to process their application. Realistically, staff are necessary to process applications and permits, and, as Federal employees, they are entitled to pay and benefits. A recent proposal in the Federal Register (August 26, 2003) proposed to increase the cost of a depredation permit to $50 for individuals and $100 for businesses and organizations. This increase would help offset the cost for providing special services that provide benefits to identifiable recipients. The USFWS's migratory bird permitting function received some appropriated funding, but not enough to cover costs, most of which are salary. The last permit fee increase was in 1982 and the average Federal Government salary has increased by 128% since that time. Also, during the past 20 years, permit applications have become more numerous, complex and time consuming to process. Issuance of depredation permits requires compliance with the National Environmental Policy Act, which requires additional work from wildlife biologists and managers, to ensure that the take of migratory birds authorized by permits will not create significant impacts to their populations. The USFWS will continue to work with ideas that will improve customer service.

Currently, most farmers place expectant cows in one or a few pastures with easy access. The farmers try to visit the cattle

one or more times per day to harass vultures with pyrotechnics, to scare the vultures by shooting, to chase vultures from the pasture with trucks, dogs, and ATVs, and, if they have a permit, to shoot some vultures to reinforce harassment. Farmers also ask their neighbors to assist with harassment and husbandry efforts when they are away from the farm. It is rare to have dead livestock on the farms, but when it occurs the dead livestock are promptly buried or incinerated on most farms. Burying dead livestock during the winter when the ground is frozen is impractical. These control measures have been ineffective at stopping vulture predation on livestock in the Radford area and most of Virginia (Lowney 1999).

Issue 3: **WS should remove information about potential human health threats and pathogenic diseases from the environmental assessment because there have been no significant health threats.**

Program Response: The National Environmental Policy Act requires federal agencies to put all relevant information used by the agency to make a decision into the EA and decision document. The EA reported in section 1.3.5.2 that the risk to human health from vulture feces and vomit was low. Moreover, Table 1-2 showed the public rarely reported threats to human health from vultures. The public reported only 90 incidences of threats to human health due to feces, vomit, or odor out of 1,471 requests for assistance. Therefore, threats to human health from vultures are not significant and this is consistent with the information presented in the EA.

Issue 4: **BBS and CBC data are inappropriate for monitoring impacts on vulture populations.**

Program Response:

The BBS and CBC data are the survey instruments used by the U.S.D.I., USFWS; U.S. Geological Survey, Division of Biological Survey, and U.S.D.A. WS for monitoring vulture and other bird populations. These survey instruments can reveal important changes in the status of a species population across a broad area. They have been used since the 1980's to detect declines in bird species abundance and since 1994 to estimate population trends (Peterjohn 1994). These survey instruments are appropriate for detecting broad population trends for vultures (Kirk and Mossman 1998, Kiff 2000). For a vast majority of the approximately 650 bird species in North America there is no feasible way to estimate population size because methods have not been developed/tested for the species in question or the methods are too labor intensive to implement in large-scale surveys (Link and Sauer 1998). Thus government agencies, conservation organizations, and others must rely on existing survey instruments to monitor the status of individual bird species populations. Section 4.1.1.1 in the EA and Issue 5 in the Decision and FONSI signed on January 15, 2003, discuss this issue in greater detail.

The BBS is the primary source of information on population change and relative abundance for many North American bird species (Sauer et al. 2003a). Survey results are used for a variety of conservation activities including setting harvest regulations for mourning doves (Sauer et al. 1994) and developing management plans for regional conservation initiatives such as Partners in Flight (Carter et al. 2000). Surveys, such as the BBS, form the primary sources of information on population change (Link and Sauer 1998). While flaws in the BBS are well documented (Sauer et al. 2003) it remains one of the best survey instruments available for most bird species, including vultures.

The CBC survey is another appropriate survey instrument for detecting broad population trends for vultures (Kirk and Mossman 1998, Kiff 2000). We feel the CBC is appropriate data to use for vulture population analysis because there is no definitive population estimate for vultures and this survey instruments allow us to monitor wintering vulture population trends. While CBC observation sites may change from year to year, it is possible to analyze CBC data from the same observation sites to analyze population trends (M. Avery, NWRC, pers. commun.). Also, the CBC is a 24-hour survey thus it can count vultures throughout the day and its less affected than surveys that count only during a smaller time frame of the day. This can be important as turkey vultures are more numerous in the afternoon than in the morning (Bunn et al. 1995).

The BBS is used by environmental organizations and others to show changes in bird species populations. At a June 27, 2003, meeting between WS and birding and animal advocacy organizations, and one professor, they agreed that trend data from the BBS and CBC data provide the best information available on vulture population change. While WS used the BBS to document increasing population trends in Virginia, one birding organization used the BBS to document declining

trends in black vulture populations in Alabama, Illinois, Louisiana, Mississippi, and regions of Texas (email from G. Winegrad, American Bird Conservancy, to B. Clay, WS, June 13, 2003). The same birding organization also used the BBS to report declining trends in turkey vultures in 6 states (letter from G. Fenwick and G. Winegrad, American Bird Conservancy, to M. Lowney, WS, October 11, 2002).

Issue 5: **Population reduction for Individual Roosts is ineffective because it attracts new vultures to the roost site.**

Program Response: The Virginia WS program has been dispersing vulture roosts from urban/suburban areas since 1998. In some years WS dispersed up to six roosts occupied by 12 to as many as 320 vultures each. In 5-9 nights all vultures were dispersed and no vultures returned to the roost site until the following year. The exception to this finding was the dispersal of a vulture roost in Staunton in December 2001 because the vultures subsequently reoccupied a former roost about 3 miles away. The landowner started a harassment program and the vultures returned to Staunton. The roost was dispersed again by WS after coordination with the landowner. The vultures then moved to a new site where there was no conflict.

The dispersal of vulture roosts demonstrates clearly that unoccupied roosts are not immediately re-occupied. In our experience, population reduction does not generally result in new vultures filling a void. Also, population reduction is a commonly practiced method in wildlife management to reduce damage to property, the environment, agriculture, and human health and safety. Some of the best contemporary examples of population reduction to reduce damage are annual deer and Canada goose hunts in Virginia and the other 47 continental states, and snow goose conservation hunts in Canada and the United States. The USFWS recently released several environmental impact statements and a environmental assessment showing population reduction was the most effective method to reduce damage caused by snow geese (50 Code of Federal Regulations 21.60, 64 Federal Register 71236), resident Canada geese (USFWS 2002, USFWS 1998, 64 Federal Register 32766), and double-crested cormorants (68 Federal Register 58022-58037, USFWS 2003a).

Issue 6: **There is a need for research to develop a technique to estimate vulture populations.**

Wildlife Services Program and Fish and Wildlife Service response: We agree. If the WS or USFWS are funded by Congress or another funding source to conduct this research, it would be conducted.

Issue 7. **Fragmentation of the habitat by development and an increasing human population is harmful to vulture populations.**

Program response: Black and turkey vulture populations have been increasing and expanding their ranges for most of the 20th century in North America (Kiff 2000, Buckley 1999, Kirk and Mossman 1998). Black vultures colonized Virginia in the 20th century. Both black and turkey vultures have increased their populations in Virginia since at least 1966 (Sauer et al. 2003, NAS 2002). These range expansions and vulture population increases have occurred during a period of unprecedented human population growth to nearly 300 million humans in the U.S. in 2003. Also, the human population in Virginia has increased from 6.2 million people in 1990 to over 7.2 million people in 2002.

Black and turkey vultures have benefited from fragmentation of the landscape by humans (Kiff 2000). After more than two centuries of clearing and re-growing forests, the current habitat is a mosaic of forest patches and open areas (Kiff 2000). Coleman and Fraser (1989) showed the importance of this mosaic of forested and open areas for roosting, nesting, and foraging. Vultures have clearly adapted to and thrived in the presence of man. Even if these factors did indeed cause adverse effects to vulture populations, WS has no authority to regulate land use or human populations.

APPENDIX B

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